Fear of falling and emotional regulation in older adults

Abstract

Objectives: Fear of falling is common amongst older adults with and without a prior experience of falling. It is related to decreased quality of life, isolation, and institutionalisation. It also poses a risk for future falls when activity is avoided because of fear of falling and muscle deconditioning occurs. Relatively little is known about the psychological factors underpinning fear of falling. This study explored the relationship between emotion regulation and fear of falling in community dwelling older adults.

Method: A sample of 117 older adults (>65 years) were recruited from community based exercise classes, falls reduction classes, NHS and charity organisations. Self-reported measures included the Falls Efficacy Scale-International (FES-I), the Fear of Falling Behaviour Questionnaire (FFABQ), the Difficulties in Emotion Regulation Scale (DERS) and the Hospital and Anxiety Depression Scale (HADS).

Results: A significant positive correlation was found between emotion regulation and fear of falling, as well as between emotional regulation and fear-related avoidance behaviour. A regression model found that after controlling for depression and age, emotion regulation was no longer significantly related to fear of falling.

Conclusions: Fear of falling is associated with emotion regulation difficulties in community dwelling older adults. However, this link no longer exists once depression is controlled for. The key clinical implication is the importance of the assessment of depression in older adults with a fear of falling. Future research should use a longitudinal design to further unpick the causal relationships between these variables.

Keywords: fear of falling; older adults; depression; anxiety; emotional regulation

Introduction

Fear of falling is a major health problem affecting older adults (Landers, Durand, Powell, Dibble, & Young, 2011) and considered as significant a problem as falling itself, being linked to many adverse consequences including: functional decline, reduction in social participation, decreased quality of life, depression and anxiety, institutionalisation, and indeed, an increased risk of falling (Landers et al., 2011; Kempen, van Haastregt, McKee, Delbaere, & Rixt Zijlstra, 2009). Older adults experiencing a fear of falling may restrict their movements to prevent a fall, but in doing so, their physical agility is reduced and, therefore, the likelihood of a fall increases. Prevalence rates for fear of falling in older adults vary between 20.8% and 85% in a systematic review (Scheffer, Schuurmans, van Dijk, & de Rooij, 2008), depending on the population being studied and measure being used. Many measures assess the cognitive element of fear , i.e. the anticipation and concern that one may fall. This fear may or may not translate into the behavioural aspect of fear of falling such as avoidance. Amongst older adults with a fear of falling, Kempen et al. (2009) reported that between 15% and 55% of them restrict their activity owing to a perceived risk of falling, whilst Chung et al. (2009) reported that 25% of older adults with a fear of falling restrict their movements after falling.

Fear of falling was previously considered a natural reaction to the trauma of a fall (Scheffer et al., 2008) and an understandable phenomenon in older age. However, it is now accepted to be a real health concern and not a normal part of ageing (Scheffer et al., 2008; Legters, 2002). It is clear that the relationship between falling and fear of falling is complex. Whilst a significant proportion of older adults develop a fear of falling after a fall, a significant proportion of them do not go on to develop this post-fall fear. Furthermore, it is now widely accepted that a prior fall is not a prerequisite for developing a fear of falling, which is found in a significant proportion of older adults who have not had a fall (Legters, 2002). Additionally, the observed phenomenon of fear of falling leading to an increased risk of falling suggests that it is not a logical way to prevent falls in older adults. It is apparent that older adults are at risk of developing a fear of falling. This fear is often more exaggerated than the actual chance of having a fall. It is therefore important that we further explore this public health problem.

A number of physical and cognitive factors have been found to predict increased risk of fear of falling and indeed some interventions have been based on modifying these elements. However, research suggests that the reasons for fear of falling are multifactorial and include psychological factors which should be taken into account when developing interventions (Legters, 2002). Anxiety is one such factor which has been found to predict a higher risk of fear of falling (Young & Williams, 2015). Indeed some researchers have conceptualised fear of falling as an expression of generalised anxiety amongst older adults. Howland et al. (1993) found that fear of falling was highly associated with other fears that older adults had, such as fear of robbery, losing a precious item or developing a serious health problem. It is acknowledged that anxiety may also be a consequence of fear of falling and hence this relationship is bi-directional.

In a study that aimed to examine the role of anxiety in fear of falling and its correlates, Delbaere, Close, Brodaty, Sachdev and Lord (2010) compared those who overestimated their risk of falling with those who underestimated it. Individuals with high levels of anxiety were found to perceive their risk of falling in excess of their physiological risk. This group also reported higher levels of depressive symptoms and neuroticism. In contrast, an under-estimation of perceived risk was found to act as a protective factor against future falling and this relationship was moderated by lower scores of neuroticism and depression. Similarly, Mann and colleagues (2006) also found neuroticism to predict fear of falling in community-dwelling older women. Further exploration of the relationship between psychological factors and fear of falling could help explain why some older adults develop a fear of falling whilst others do not, highlighting which facets should be targeted in interventions. Indeed, intervention models which have targeted the psychological aspect of fear, such as Cognitive Behaviour Therapy (CBT), have been found to be effective (Tennstedt et al., 1998). However, there is still a dearth of knowledge about which particular psychological processes are related to the development and maintenance of fear of falling and hence which should be targeted in interventions.

A related construct that may potentially be associated with fear of falling is emotion regulation. Emotion regulation is the process that determines which emotions a person experiences, for how long, and the intensity with which emotions are experienced

(Thompson, 1994). Research has found that older adults report more use of adaptive emotion regulation strategies such as reappraisal and less use of maladaptive strategies such as rumination (Garnefski & Kraaij, 2006). Older adults have also been found to be better at up-regulating positive affect and down-regulating negative affect (Urry & Gross, 2010; Mather & Carstensen, 2005; Larcom & Isaacowitz, 2009). This is in line with the socioemotional selectivity theory (Mather & Carstensen, 2005), which postulates that as people age, they become more aware of their decreasing lifespan. Realising their future time is limited, older adults make attempts to maximise positive experiences.

Indeed better emotion regulation has been postulated as a possible explanation for why older adults generally report lower levels of anxiety and depression than younger adults (Gum, King-Kallimanis & Kohn,2009). Whilst it appears that improvements in the ability to regulate emotions may serve as a protection for older adults from psychological distress, there is also evidence to suggest that emotion regulation difficulties in older adults are similarly linked to increases in psychopathology, in particular anxiety and depression, as with younger adults. For example, Orgeta (2011) found that older adults with mild depressive symptoms reported more difficulties in emotion regulation, whereas those without depressive symptoms reported greater use of reappraisal strategies and less use of expressive suppression. Difficulties in emotion regulation have also been associated with psychological distress in older adults with physical comorbidities (Petkus, Gum & Wetherell, 2012). Thus, whilst physical ill-health is a risk factor for depression in older adults, this risk could be further increased by emotional regulation difficulties.

Aims of the Study

Despite growing evidence that emotion regulation is related to psychological distress amongst older adults, there has been no previous research looking at the relationship between emotion regulation, fear of falling, and fear of falling avoidance behaviour in older adults. Therefore, the aims of this study were to test the following hypotheses:

1) Higher levels of fear of falling will be positively related to greater difficulties in emotion regulation.

2) Higher levels of fear of falling avoidance behaviour will be positively related to greater difficulties in emotion regulation.
3) Emotion regulation will predict fear of falling above and beyond demographic and psychological variables known to be associated with fear of falling (including previous falls, age, anxiety and depression).

Methods

Participants

This research was given ethical approval by the local NHS Research Ethics Committee. To be included, participants had to be over 65 and living in the community. There was no other inclusion or exclusion criterion. The sample consisted of 117 older adults aged 65–94 (mean age 76, SD 6.8) and 75% female. The majority was self-reported as ethnically White (100%), retired (100%), married (41.9%) or widowed (42.7%), and were educated to secondary school education or above (72.6%). In terms of health, around two-thirds (64.1%) considered their health as 'Good'. In terms of previous experience of falls, we asked four questions: "Have you had a fall in the past five years?" "If yes, please give details of how many falls you have had." "Did any of the above falls lead to any injuries?" and "Did your fall result in a hospitalisation?" Results suggested that more than half (59%) of the participants have had experienced at least one fall in the past five years; this includes the more serious falls that have led to injury and / or hospitalisation as well as the milder ones that have not led to injury and / or hospitalisation. Roughly half of the falls resulted in injury (49%) but only a relatively small proportion (16.2%) were hospitalised as a result of falls. See Table 1 for full demographic details of Participants.

[Insert Table 1 about here]

Procedure

Participants were recruited from various community sites, including gym based classes for older adults (28.3%), a falls reduction group for older adults (24.3%), a nationwide charity (23.5%), a local charity a day centre for older adults which provided falls reduction advice (2.6%) and NHS sites including an older adults' psychology department, a rehabilitation post-

fall service and an osteoporosis service (8.6%); source of recruitment was not recorded for a small proportion of participants (8.7%). Participants were informed about the study by staff in their respective group, and were given research packs which contained participant information sheets, a demographic form and four validated questionnaires (see below). All participants chose to complete the research at their own pace and return the questionnaires by post, although participants were informed that they can request support from the researcher to complete the questionnaires. Consent was implied by participants completing and returning the questionnaires; this procedure was adopted following advice from the ethics committee. A total of 425 packs were given to staff within the above organisations to distribute to potential participants. However, it was not possible to monitor how many of these staff gave to potential participants and so the return rate is unknown.

Measures

The Falls Efficacy Scale International (FES-I, Yardley et al, 2005): This is a 16-item questionnaire designed to measure the cognitive aspect of fear of falling. It asks participants to rate their degree of concern about falling in a range of situations (e.g. cleaning the house, answering the telephone and walking on an uneven surface) from "not at all concerned (1)" to "very concerned (4)" and yields a maximum total score of 64 with higher scores indicating more concern. Based on 704 older adults, there was evidence for good internal reliability and test-retest reliability (both Cronbach's alpha and ICC = 0.96; Yardley et al., 2005). In the current study, internal consistency was good with a Cronbach's alpha of 0.96.

Fear of Falling Avoidance Behaviour Questionnaire (FFABQ) (Landers et al. 2011): This is a 14-item self-report measure which looks at avoidance of activity as a result of fear of falling and is rated on a Likert scale. Participants are asked to rate how much they avoid a variety of activities because of their fear of falling, from 0 to 4. It yields a total possible score of 56 with higher scores indicating more avoidance. It was found to have good test-retest reliability and predictive validity (Landers et al., 2011). In the current study, internal consistency was good with a Cronbach's alpha of 0.95.

Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983): The HADS is a 14-item measure assessing symptopms of anxiety and depression. It was specifically designed for use on people with physical health problems. As such, the measure reduces the likelihood of symptoms attributable to physical problems being mistaken as anxiety and depression. Participants rate each item from 0 to 3. The subscales for anxiety and depression can range from 0-21 with scores categorised as follows: normal (0-7), mild (8-10), moderate (11-14), severe (15-21). In the current study internal consistency was good with a Cronbach's alpha of 0.84 for the overall scale, 0.77 for Anxiety subscale and 0.78 for Depression subscale.

The Difficulties in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2004): This is an easily administered questionnaire which assesses six domains of emotion regulation: (a) awareness of emotional responses; (b) understanding of emotions; (c) non-acceptance of emotions; (d) the ability to engage in goal-directed behaviour when upset; (e) the ability to refrain from impulsive behaviour when experiencing negative emotions; and (f) access to emotion regulation strategies perceived as effective. It contains 36 items and respondents are asked to rate how much each statement applies to them on a scale from 1 (almost never) to 5 (almost always). Higher scores signify greater difficulties with emotion regulation. The DERS has been found to have high internal consistency ($\alpha = .93$), good test-retest reliability, and adequate construct and predictive validity (Gratz & Roemer, 2004). It has also been used with older adults (Orgeta, 2011). In the current study, internal consistency was good with a Cronbach's alpha of 0.89

Data Analysis

All analyses were conducted in the Statistical Package for the Social Sciences (SPSS) version 19. To investigate the relationship between fear of falling and difficulties in emotion regulation (hypothesis 1) as well as the relationship between emotion regulation and fear of falling avoidance behaviour (hypothesis 2), bivariate correlations were performed. The Kilmorgorv-Smirnov test was carried out to assess whether the data was normally distributed. The assumption of normally distributed data was not met for FES-I, HADS-Depression, FFABQ and number of falls. It was not possible to transform the data to normal distribution. As such, non-parametric correlations were calculated. To determine whether difficulties in emotion regulation contributed unique variance in the fear of falling total scores, a linear

regression analysis was performed (see details below) to address Hypothesis 3. To account for the data being non-normally distributed, bootstrapping was performed (Field, 2009).

Results

Descriptive Data

On the HADS anxiety subscale 88.9% of the participants scored within the range of no clinical symptoms or mild symptoms and 11.1% experienced moderate symptoms. On the HADS depression scale, 95.6% scored within the range of no or mild clinical symptoms and 4.4% self-reported to have moderate depressive symptoms. Mean scores for the measures are presented in Table 2. Correlations between variables are presented in Table 3.

[Insert Table 2 and Table 3 about here]

Hypothesis 1

There was a significant positive correlation between fear of falling and difficulties in emotion regulation, DERS total score was positively correlated with FES-I total with a medium effect size, $r = .36$, $p < .001$. Fear of falling was also correlated with the five DERS subscales in that higher reported FES-I score was significantly and positively correlated with non-acceptance of emotional responses ($r = .24$, $p = .021$), greater difficulties in engaging in goal directed behaviour ($r = .29$, $p = .005$), less awareness of emotional responses ($r = .30$, $p = .005$), greater difficulties in accessing effective emotion regulation strategies ($r = .23$, $p = .029$) and lack of emotional clarity ($r = .26$, $p = .012$). By contrast, fear of falling was not significantly related to greater impulse control difficulties ($r = .17$ $p = .119$).

Hypothesis 2

Difficulties in emotion regulation were also correlated with greater fear of falling behaviour avoidance, DERS total score was positively correlated with FFABQ with a medium effect size, $r = .38$ $p<0.001$. However, FES-I and FFABQ were highly correlated, $r = .888$, suggesting collinearity. Since FES-I and FFABQ appeared to be measuring the same construct, FFABQ was dropped from further analysis.

Hypothesis 3

A regression model with fear of falling as the predicted variable was used to explore whether emotion regulation accounted for fear of falling above and beyond other variables: At step 1, demographic variables known to be associated with fear of falling, namely age and number of falls, were entered first. In the first step, age and number of falls were significantly related with fear of falling. This model was significant, $F(2, 85) = 9.17$, $p<.001$, explaining a total of 18% of the variance. At step 2, HADS Anxiety and HADS Depression were entered. The model was significant, $F(4, 85) = 8.38$, explaining a total of 29% of the variance (i.e. an increase of 11% from the first model). Depression was significantly related to fear of falling but anxiety was not. Age remained significantly related to fear of falling, number of falls did not. At Step 3, DERS was entered to determine the unique contribution of emotion regulation to fear of falling. The model was significant, $F(5, 85) = 6.70$, but adding difficulties in emotion regulation was not found to increase the total variance explained with the final model still only explaining 29% of the variance. Only age and depression remained significantly related to fear of falling. See Table 4.

[Insert Table 4 about here]

Additional Analysis

In view of the collinearity issue between the FES-I and FFABQ, it would seem appropriate to run Hypothesis 3 with the FFABQ as the predicted variable since it appears that the FFABQ had overall higher correlational values (with DERS and HADS Anxiety) than the FES-I. Using the same approach, at Step 1, the model was significant, $F(2, 64) = 13.85$, $p<.001$, explaining a total of 31% of the variance. Both age and number of falls were significant predictors (both p's $< .03$) At step 2, the model was significant, $F(4, 64) = 9.90$, $p <0.01$, explaining a total of 40% of the variance (i.e. an increase of 9% from the first model). Depression was significantly related to fear of falling avoidance behaviour ($p =.049$) but anxiety was not ($p=.36$). Age and number of falls remained significantly related to FFABQ (both p's $<. 03$). At Step 3, the model was significant, $F(5, 64) = 8.14$, explaining 41% of total variance (i.e. adding DERS only led to an increase of 1%). Only age remained significantly related to fear of falling avoidance behaviour ($p<.01$).

Discussion

This study found that both fear of falling and fear of falling avoidance behaviour were correlated with greater difficulties in emotion regulation, with medium effect sized detected. The regression analysis showed that age and depression significantly predict fear of falling. Difficulties in emotion regulation, previous number of falls and anxiety, however, did not account for any significant variance. There was a stronger association between depression and fear of falling than between anxiety and fear of falling; this finding is contrary to the conceptualisation of fear of falling as a specific type of anxiety (Bryant, Jackson & Ames, 2008) or an expression of generalised anxiety (Howland et al., 1993) and previous findings that fear of falling was the most commonly reported worry among older adults. However, it is consistent with Gagnon, Flint and Naglie (2005) which found that depression was the factor most strongly associated with fear of falling. Notably, difficulties in emotion regulation was no longer a significant predictor for fear of falling when depression was accounted for, suggesting that this relationship can be at least in part accounted for by the link between depression and emotion regulation difficulties. This is consistent with previous research (which found depression to be related to the use of specific emotion regulation strategies (Orgeta, 2011), as well as the proposed model of anxiety and depression being postulated to arise from greater difficulties with regulating emotions (D'Avanzato, Joormann, Siemer & Gotlib, 2013).

It is possible, therefore, that a pathway for the development of fear of falling occurs via increased difficulties in emotion regulation increasing the likelihood of psychological distress in particular depression. However, this study, similar to Gagnon et al. (2005) and most previous research, was cross-sectional. As such, the temporal onset of symptoms and the direction of relationships cannot be ascertained. It is possible that fear of falling causes an increase in depressive symptoms, rather than the other way around. Gagnon et al. (2005) suggested that depression may be a consequence of activity restriction in older adults with a fear of falling, because it can lead to social isolation and decreased quality of life. Consistent with this, Chou and Chi (2008) found that fear of falling prospectively predicted depression at long term follow-up. However, participants were dichotomised into those with a fear and those without based on whether they did or did not restrict their behaviour. Since older adults may restrict some, but not all, of their behaviours due to a fear of falling, measuring the construct this way may not be accurate. Furthermore, fear of falling does not always translate

to avoidance behaviour, and thus the link between the cognitive element of fear of falling and depression is not conclusive. We therefore performed an additional regression with avoidance behaviour as the predicted variable, as a comparison with the planned analysis with fear of falling as the predicted variable. Results suggested that while depression remained a significant predictor of avoidance behaviour in Model 2, once emotional regulation difficulties (DERS) was added to the model (Model 3) depression ceased to be a significant predictor. In other words, depression appears to play a more significant role in explaining fear of falling than avoidance behaviour. Taken together, the relationship between fear of falling and depression could be bi-directional. Longitudinal research in the future would allow for investigation of the time course of depression, anxiety, fear of falling, avoidance behaviour and emotion regulation in older adults.

As discussed, fear of falling has been previously conceptualised as a specific type of anxiety. However, results of this study and that of Gagnon et al. (2005) suggest that depression may be associated with fear of falling to a greater degree. This suggests that careful assessment of depression as well as anxiety should be conducted with older adults. Whilst anxiety may be easier to detect than depression, for example, because of observable hyper-arousal, depression may be relatively harder to detect. The findings of this study suggest that depression should be given specific attention in older adults presenting with a fear of falling.

There has been a recent increase in the interest of the psychiatric correlates of fear of falling, and the current study paves the way for further research. Previous research has argued for multifactorial interventions for fear of falling (Legters, 2002), although as Legters pointed out, relatively little research has investigated such approaches. The regression model in this study only accounted for 29% of the variance of fear of falling. Previous research has highlighted the importance of physical factors and cognitive difficulties that may account for fear of falling. A model which include these factors alongside psychological factors would help increase understanding of the relative importance between different factors. Previous research found that neuroticism is related to fear of falling as well as to depression (Delbaere e al., 2010; Mann et al., 2006) and as such could be added to exploratory analyses of the associations between variables.

Interventions which have focused on developing physical ability, for example with specific exercise programmes (Sattin, Easley, Wolf, Chen, & Kutner, 2005), have been found to reduce fear of falling. Gagnon et al. (2005) pointed out that it is unclear whether such programmes would also lead to a decrease in depression and anxiety. CBT for fear of falling has also been found to be effective in a randomised control trial (Tennstedt et al., 1998), leading to the hypothesis that cognitive-behavioural changes must take place for fear of falling to be addressed, and for avoidance of activity to be reversed. However, it is still unclear which older adults are most suitable for these interventions and whether interventions aimed at strengthening physical agility may also lead to cognitive-behavioural changes via encouraging activity, or whether changes would only occur through specific CBT interventions.

This study demonstrates that although there is a link between emotional regulation difficulties and fear of falling, it no longer exists once age and depression were controlled for. Limitations to detect a unique contribution of emotion regulation to fear of falling may have arisen from the measure used. The DERS assesses difficulties in regulation emotions including a lack of acceptance, awareness and clarity of emotions, as well as difficulties accessing strategies and meeting goals. Therefore, whilst it is a comprehensive measure of emotion regulation difficulties, it does not assess all specific strategies which have been found to be related to depression and anxiety in older adults. For example, rumination has been found to have a specific relationship with depression (D'Avanzato, Joormann, Siemer, & Gotlib, 2013) but was not measured by DERS.

In this study, a high correlation between fear of falling and the fear of falling avoidance behaviour suggests that both measures were tapping into the same construct. This is in contrast to previous research which has suggested that only a proportion of older adults restrict their behaviour as a result of a fear of falling. It is unclear whether the FFABQ and the FES-I are truly measuring the same construct, or whether the finding in this study was specific to this sample. In its development, the FFABQ was found to be moderately correlated with the FES, suggesting that these constructs, whilst overlapping, were distinct. The FES-I has greater construct validity as a fear of falling measure in that it asks about concern about falling, in comparison to the FES which asks about confidence in the ability to

perform tasks without falling. This suggests that FFFBQ may be more strongly associated with worry about falling than with measures of efficacy of performing activities without falling. In both the present study and in Landers et al. (2011), there were generally low levels of fear of falling. Future studies should aim to recruit older adults with higher levels of fear of falling to assess the proportion who also avoid activity. This would allow further exploration of the factors that are associated with increased levels of activity avoidance and, similarly, those factors that appear to act as protective factors against cognitive worries about fear translating into avoidance behaviour.

Limitations

The cross-sectional nature of this study means it is not possible to be certain about causality. Future studies which utilise longitudinal study design are required to further unpack the relationship between hypothesised predictors. The majority of participants in this study were from a non-clinical sample who generally reported low levels of fear of falling, difficulties in emotion regulation, anxiety and depression. It is possible that those who took part were more able than those who did not, or those who did not take part may have had increased anxiety and depression which may have affected their motivation to take part. The sample was also predominantly female and ethnically White. This mirrors previous research investigating fear of falling (Yardley et al.2005; Sattin et al., 2005) and may pose limitations about the applicability of these findings to men and other cultural groups. Older adults in the sample also varied with regards to the interventions they had received and it is recognised that they may have exhibited a decreased fear of falling owing to such approaches potentially confounding the results. Indeed, more than 60% of our participants were recruited from services and groups where we would expect older adults to be more physically active and having more awareness and skills in preventing the risk for falling; such as gym based classes, falls reduction group and advice services, and post-fall rehabilitation services. Results may be different if the sample consisted of more older adults recruited from the general population without being biased towards these selected groups. Future research should aim to recruit older adults before they receive interventions for falling or fear of falling. Collection of more in-depth information about previous experience of falls, such as details of each fall, would be helpful in advancing our understanding of how different types / severity levels of falls may lead to different psychological and behavioural consequences. Lastly, the DERS, whilst showing good internal consistency within this study and having

been used with older adults in previous studies, (Orgeta, 2011) does not measure all of the facets of emotion regulation that may be implicated.

Despite the above limitations, this study generated novel findings that explored the relationship between emotion regulation and fear of falling in older adults. It adds to the research which has found that depression is associated with fear of falling in older adults, and suggests that the mechanisms by which this occurs should be investigated further. An additional strength of this study was that the sample included older adults with a previous fall as well as those who have not experienced any falls. A good sample size was achieved which demonstrates the feasibility and acceptability of collecting data from older adults by post.

Conclusion

Fear of falling is associated with emotion regulation difficulties in community dwelling older adults. However, emotion regulation did not predict fear of falling once depression is controlled for. This suggests that the relationship between fear of falling and emotion regulation can be accounted for by the relationship between emotion regulation and depression. The key clinical implication of this study is the importance of the assessment of depression in older adults with a fear of falling. Future research should assess whether other emotion regulation strategies are implicated, especially those that have been found to be associated with depression.

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Table 1 Demographics of Participants

Marital Status	Married 41.9%
	Widowed 42.7%
	Single & Never married 5.2%
	Divorced 6%
	Other 0.9 %
	Not Reported 3.4%
Level of Education	Primary school 4.3%
	Secondary 48.7%
	Undergraduate degree or above 23.9%
	Other 11.1%
	Not-reported 12%
Self-rated health	Good 64.1%
	Not too good 21.4%
	Poor 3.4%
	Not reported 11. 1%
Number of falls in past five years	Never had a fall 37%
	One fall 20%
	Two falls 19%
	Three or more falls 20%
	Not reported 4%
Hospitalised as a result of fall	Yes 16.2%
	No 77.8%
	Not reported 6%
Injury from Fall	Yes 48.7%
	No 44.7%
	Not reported 6.6%

Table 2 Mean scores for study variables

Measures	n	M	SD
FES-I	104	26.73	10.4
FFABQ	94	12.42	13.3
DERS TOTAL	100	70.42	19.31
DERS Non-Acceptance	101	11.52	5.12
DERS Goals	103	10.16	3.79
DERS Impulse	103	9.32	3.20
DERS Awareness	103	15.85	5.30
DERS Strategies	102	13.43	5.34
DERS Clarity	100	8.81	3.81
HADS Anxiety	106	5.68	3.31
HADS Depression	105	4.04	3.14
HADS Total	105	9.73	5.50

Table 3 Correlations between study variables

	1	2	3	3.1	3.2	3.3	3.4	3.5	3.6	4	5	6	7
1.Age	1	.155	.141	.109	.122	.148	.182	.116	.135	.389**	.410**	.037	.271**
2.Falls		1	.221*	.106	.147	.062	.091	.137	.112	.457**	.412**	.037	.203*
3.DERS			1	.661**	.747**	.693**	.610**	.813**	.725**	.355**	.384**	.470**	.545**
3.1 Non-accept				1	.459**	.465**	.148	.502**	.345**	.241*	.344**	.368**	.215*
3.2 Goals					1	.554**	.247*	.731**	.391**	.293**	.345**	.442**	.461**
3.3 Impulse						1	.229*	.598**	.397**	.165	.223*	.193	.261*
3.4 Aware							1	.304**	.666**	.292**	.315**	.269**	.384**
3.5 Strategies								1	.445**	.229*	.329**	.454**	.500**
3.6 Clarity									1	.260*	.292**	.281**	.332**
4.FES-I										1	.888**	.243*	.512**
5.FFABQ											1	.291**	.494**
6.HADS Anxiety												1	.465**
7.HADS Depression													1

Values represent correlation coefficient r * Correlation is significant at the 0.05 level **Correlation is significant at the 0.01 level

3.1 – 3.6 are subscale scores of DERS, namely non-acceptance of emotional responses (Non-accept), difficulties engaging in goal-directed (Goals), impulse control difficulties (Impulse), lack of emotional awareness (Aware), limited access to emotion regulation strategies (Strategies), and lack of emotional clarity (Clarity).

Table 4 Hierarchical regression analysis for variables predicting fear of falling in older adults (n = 85)

	B	SE B	Confidence intervals	B
Step 1				
Constant	-13.56	12.7	-38.20 to 11.11	
Age	0.50	0.17	0.16 to 0.81	.35***
Number of falls	1.44	0.56	0.41 to 2.70	.22*
Step 2				
Constant	-10.13	12.61	-34.3 to 14.07	
Age	.40	.17	0.53 to 0.73	.28**
Number of falls	1.20	.60	0.65 to 2.58	.18
HADS D	1.03	.39	0.31 to 1.83	.32**
HADS A	.160	.36	-58 to .86	.05
Step 3				
Constant	-11.10	12.77	-35.69 to 14.38	
Age	.38	.18	.03 to .74	.27**
Number of falls	1.16	.63	-.02 to 2.62	.18
HADS D	.97	.40	.27 to 1.86	.30**
HADS A	.10	.34	-.58 to .76	.03
DERS	.03	.08	-.13 to .17	.06

$\Delta R^2 = 0.18$ for Step 1, $\Delta R^2 = .11$ for step2, $\Delta R^2 = .002$ for Step 3

* significant at the 0.05 level

** significant at the 0.01 level

*** significant at the 0.001 level

HADS D = HADS Depression, HADS A= HADS Anxiety